


Compound Absolute values  
and  
Double Absolute Value Inequalities

Just Watch!

$$2 \leq |x| < 5$$

example:


$$1 \leq |x-3| \leq 4$$

$$\begin{array}{l}
 |x-3| \geq 1 \quad \text{AND} \quad |x-3| \leq 4 \\
 x-3 \geq 1 \quad \text{OR} \quad x-3 \leq -1 \quad \text{AND} \quad x-3 \leq 4 \quad \text{AND} \quad x-3 \geq -4 \\
 x \geq 4 \quad x \leq 2 \quad x \leq 7 \quad x \geq -1
 \end{array}$$




Do:

$$4 \leq |8-2y| < 10$$

$$\begin{array}{l}
 y \leq 2 \text{ or } y \geq 6 \quad \text{AND} \quad -1 < y < 9
 \end{array}$$


## Double Absolute Value

ex:  $|3x + 2| < |x - 2|$

$3x + 2 < |x - 2|$  AND  $3x + 2 > -|x - 2|$   
 $|x - 2| > 3x + 2$        $-3x - 2 < |x - 2|$   
 $x - 2 > 3x + 2$  OR  $x - 2 < -3x - 2$        $|x - 2| > -3x - 2$   
 $-4 > 2x$        $4x < 0$        $x - 2 > -3x - 2$        $x - 2 < 3x + 2$   
 $-2 > x$        $x < 0$        $x > 0$        $x > -2$   
 $x < -2$